Claims

[c1]   1. A method for controlling a bicycle transmission based on rider-selected wheel speeds, the method comprising the steps of:

actuating a controller mounted on a bicycle to enter a setting mode;

manually shifting the bicycle transmission into a selected gear during the setting mode by operating a shift actuator coupled to the bicycle transmission;

storing a bicycle speed for the selected gear in a memory of the controller;

repeating said steps of shifting and storing for each rider-selected gear; and

automatically shifting the bicycle transmission by the controller in accordance with the stored bicycle speeds during an automatic mode.

[c2]   2. A method as in claim 1 further including the step of defining a plurality of speed ranges in accordance with the stored bicycle speeds such that each speed range corresponds to a gear of the bicycle transmission.

[c3]   3. A method as in claim 2 wherein the step of automatically shifting the bicycle transmission includes the steps of:

measuring a current bicycle speed during the automatic mode;

determining a current gear during the automatic mode;

comparing the current bicycle speed with the speed range corresponding to the current gear during the automatic mode; and

changing the current gear when the current bicycle speed is outside of the speed range for the current gear during the automatic mode.

[c4]   4. A method as in claim 3 wherein the step of changing the current gear includes the steps of:

changing the current gear to a higher gear when the current bicycle gear is greater than the speed range corresponding to the current gear; and

changing the current gear to a lower gear when the current bicycle speed is less than the speed range corresponding to the current gear.

[c5]   5. A method as in claim 1 further comprising the step of shifting the bicycle transmission into a lowest gear after actuating the controller to enter the

setting mode.

[c6]   6. A method as in claim 1 wherein the step of storing a bicycle speed includes the steps of:

storing a bicycle speed only when the rider changes gears from a selected one of an upshift direction and a downshift direction; and

calculating a plurality of bicycle speeds for changing gears for the nonselected one of the upshift direction and the downshift direction in accordance with the stored bicycle speeds for changing gears in the selected one of the upshift direction and the downshift direction.

[c7]   7. A method as in claim 1 wherein the step of storing a bicycle speed includes the step of calculating a plurality of bicycle speeds for automatically changing gears in one of an upshift direction and a downshift direction in accordance with the stored bicycle speed for the selected gear.

[c8]   8. A method as in claim 1 wherein each stored bicycle speed is equal to a bicycle speed greater than the preceding stored bicycle speed.

[c9]   9. A method as in claim 1 wherein the step of actuating the controller to enter the setting mode includes the step of actuating a mode switch coupled to the controller to enter the setting mode.

[c10]   10. A method as in claim 1 wherein the step of shifting the bicycle transmission in a selected gear includes the step of further comprising the step of actuating a shift control switch coupled to the controller to shift the bicycle transmission.

[c11]   11. A method for selecting a plurality of bicycle speeds to be used to automatically control the shifting of a bicycle transmission, the method comprising the steps of:

actuating a controller mounted on a bicycle to enter a setting mode;

manually shifting the bicycle transmission into a selected gear during the setting mode by operating a shift actuator coupled to the bicycle transmission;

storing a bicycle speed for the selected gear in a memory of the controller; and

repeating said steps of shifting and storing for each rider-selected gear.

[c12]   12. A method as in claim 11 further comprising the step of shifting the bicycle transmission to a lowest gear after actuating the controller to enter the setting mode.

[c13]   13. A method as in claim 11 wherein the step of storing a bicycle speed comprises the steps of:
storing a bicycle speed only when the rider changes gears from a selected one of an upshift direction and a downshift direction; and
calculating a plurality of bicycle speeds for changing gears for the nonselected one of the upshift direction and the downshift direction in accordance with the stored bicycle speeds for changing gears in the selected one of the upshift direction and the downshift direction.

[c14]   14. A method as in claim 11 wherein the step of storing a bicycle speed includes the step of calculating a plurality of bicycle speeds for automatically changing gears in one of an upshift direction and a downshift direction in accordance with the stored bicycle speed for the selected gear.

[c15]   15. A method as in claim 11 wherein the step of actuating the controller to enter the setting mode includes the step of actuating a mode switch coupled to the controller to enter the setting mode.

[c16]   16. A method as in claim 11 wherein the step of manually shifting the bicycle transmission includes the step of actuating a shift control switch coupled to the controller to shift the bicycle transmission.

[c17]   17. A shift actuator for a multiple-gear bicycle comprising:
a housing adaptable to be mounted on the bicycle;
a wheel speed input for receiving a wheel speed signal that is representative of the bicycle wheel speed;
a gear control output for transmitting a control signal to a gear shifter of the

bicycle;

a mode selector actuable by a rider to select between at least a setting mode and an automatic mode;

a shift point selector actuable by the rider to select, while the shift actuator is in the setting mode, at least one shift point which relates a current wheel speed to a current bicycle gear;

a memory for storing at least one shift point which relates at least one stored wheel speed to a respective stored gear; and

a controller coupled to the wheel speed input, the gear control output and the mode selector, the controller causing said at least one shift point to be stored in the memory when the shift actuator is in the setting mode and the rider actuates the shift point selector, the controller, while in the automatic mode, controlling the gear shifter through the gear control output such that when the wheel speed signal approximately equals the stored wheel speed, the gear shifter shifts the bicycle into the stored gear.

[c18]   18. The shift actuator of claim 17, and further comprising a display coupled to the controller for displaying the current gear of the bicycle.

[c19]   19. The shift actuator of claim 18, wherein the display further displays a current speed of the bicycle.

[c20]   20. The shift actuator of claim 17, wherein the memory stores a plurality of stored shift points each for a different gear.

[c21]   21. The shift actuator of claim 17, wherein the memory stores a range of speeds, the range being related to the stored gear, the controller, while in the automatic mode, causing the gear shifter to shift the bicycle into a gear matching the stored gear when the current speed falls into the stored range of speeds.

[c22]

22. The shift actuator of claim 17, wherein the memory stores a plurality of stored gears, a respective plurality of upshifting speeds each corresponding to a respective one of the stored gears and a respective plurality of

downshifting speeds each corresponding to a respective one of the stored gears, the controller, when in automatic mode and when the speed of the bicycle is increasing, controlling the gear shifter to upshift from a current gear to one of the stored gears when the current speed is greater than a stored upshifting speed corresponding to said one of the stored gears, the controller, when in automatic mode and when the speed of the bicycle is decreasing, controlling the gear shifter to downshift from a current gear to one of the stored gears when the current speed is less than a stored downshifting speed corresponding to said one of the stored gears.

[c23]   23. The shift actuator of claim 17, wherein the shift actuator is further rider-selectable to enter into a manual mode whereby the rider controls the gear shifter.

[c24]   24. A medium onto which has been prerecorded a computer program which, when executed by a gear shifter controller mounted on a multiple-gear bicycle, is capable of performing the following steps:
actuating a controller mounted on the bicycle to enter a setting mode;
manually shifting the bicycle transmission into a selected gear during the setting mode by operating a shift actuator coupled to the bicycle transmission;
storing a bicycle speed for the selected gear in a memory of the controller;
repeating said steps of shifting and storing for each rider-selected gear; and
automatically shifting the bicycle transmission by the controller in accordance with the stored bicycle speeds during an automatic mode.

[c25]   25. A medium as in claim 24 further including the step of defining a plurality of speed ranges in accordance with the stored bicycle speeds such that each speed range corresponds to a gear of the bicycle transmission.

[c26]   26. A medium as in claim 25 wherein the step of automatically shifting the bicycle transmission includes the steps of:
measuring a current bicycle speed during the automatic mode;
determining a current gear during the automatic mode;

comparing the current bicycle speed with the speed range corresponding to the current gear during the automatic mode; and

changing the current gear when the current bicycle speed is outside of the speed range for the current gear during the automatic mode.

[c27]   27. A medium as in claim 24 further comprising the step of shifting the bicycle transmission into a lowest gear after actuating the controller to enter the setting mode.

[c28]   28. A medium as in claim 24 wherein the step of storing a bicycle speed includes the steps of:

storing a bicycle speed only when the rider changes gears from a selected one of an upshift direction and a downshift direction; and

calculating a plurality of bicycle speeds for changing gears for the nonselected one of the upshift direction and downshift direction in accordance with the stored bicycle speeds for changing gears in the selected one of the upshift direction and the downshift direction.